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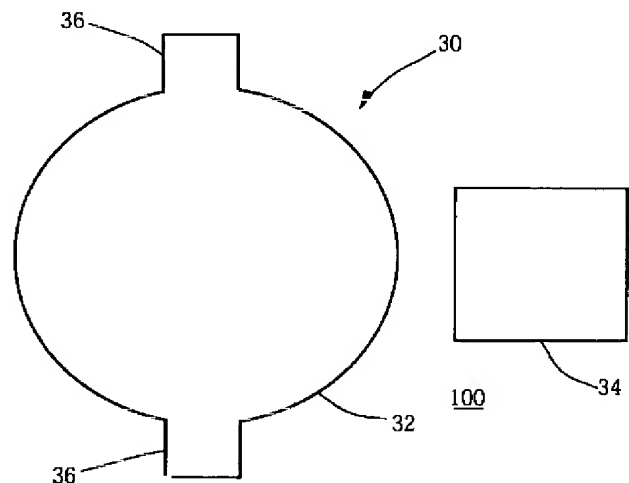
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(54)【発明の名称】 プリント基板の実装部品用パッド

(57)【要約】

【課題】 表面実装部品をプリント基板のパッドに塗布されたクリーム半田によって半田固定する際に、表面実装部品の位置ずれを生じることなく、半田付けの良否を容易かつ精度良く判定し、よって検査工程の作業能率を向上させるようにしたプリント基板の実装部品用パッドを提供する。

【解決手段】 前記実装部品用パッド30を、表面実装部品の底部電極と略同大の円形で、かつ2個の引出し部36、36を有する第1のパッド32と、第1のパッドから離間して配置した第2のパッド34から構成すると共に、引出し部は表面実装部品の外周より突出するように構成する。半田付けの良否は、リフロー後に上記引出し部上に残留した半田フィレットに基づいて判定する。



【特許請求の範囲】

【請求項1】 プリント基板上に設けられ、塗布されたクリーム半田によって表面実装部品が溶融接続されるプリント基板の実装部品用パッドにおいて、前記表面実装部品の底部に円形状の電極を設け、前記プリント基板上に引出し部を有するパッドを設けると共に、前記引出し部を前記表面実装部品の外周より突出させ、さらに前記パッドの引出し部を除く直径を前記表面実装部品の直径よりも小さく、かつ前記表面実装部品底部の円形状の電極と略同大に形成するようにしたことを特徴とするプリント基板の実装部品用パッド。

【請求項2】 前記引出し部を少なくとも2個設けると共に、前記パッドから離間した位置に第2のパッドを設け、前記2個の引出し部を、前記パッドと前記第2のパッドの中心位置を結ぶ線に対して対称となる位置に設けることを特徴とする請求項1項記載のプリント基板の実装部品用パッド。

【請求項3】 前記引出し部を、前記プリント基板上の前記表面実装部品を除く部品に干渉しない位置に設けることを特徴とする請求項1項または2項記載のプリント基板の実装部品用パッド。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は、プリント基板の実装部品用パッドに関し、より詳しくはプリント基板表面で、底面にその端子電極が形成されてなる表面実装部品が半田固定されるプリント基板の実装部品用パッドの形状に関する。

【0002】

【従来の技術】従来技術においては、端子電極が部品の底面に形成されてなるパワーツェナダイオード等の部品をプリント基板上に実装する場合、まずプリント基板のパッドにクリーム半田を塗布し、次いで上記部品をパッドのクリーム半田上に配置して加熱し、クリーム半田を溶融接続（リフロー）することにより実装を行っている。

【0003】その実装状態、特に半田付けの良否は一般的に、基板の上方からCCDカメラなどによって撮像して得た二値画像に基づいて、あるいは目視などにより判定している。

【0004】図7ないし図9に基づき従来技術に係るプリント基板の実装部品用パッドおよび検査方法について説明する。

【0005】図7は従来技術に係るプリント基板の実装部品用パッドの上面図、図8はそれにパワーツェナダイオード（以下、「ダイオード」という）を実装した状態の左側面図、図9はその説明側面図である。

【0006】従来のプリント基板の実装部品用パッド10は、第1のパッド12および第2のパッド14から構成される。ここで第1のパッド12の形状は、実装され

る部品の端子電極の形状に合わせて円形とされと共に、その直径も前記円形の端子電極の底面とほぼ同大とされる。尚、符号100はプリント基板を示す。

【0007】図8に示すように、部品実装後のパッド10には半田フィレット16を介してダイオード18が接続される。尚、前記ダイオード18は、第1のパッド12に接続される円形状の端子18aと第2のパッド14に接続されるべき端子18bとを有する。

【0008】前記ダイオード18の円形状の端子18aを、その形状に合わせたパッド12上に固着接続させてダイオード18を実装した場合、半田フィレット16が実装部品の陰に隠れてしまう。従って、図9に示すようにCCDカメラや目視などの検査手段20で基板の上方から半田付けの良否を判定しようとする際、半田フィレット16の良否を精度良く判定することができなかった。

【0009】それを解決するために、第1のパッド12を拡張することも考えられるが、パッド中心付近の半田がリフロー時に表面張力により高くなってしまい、図10に示すように、実装部品（ダイオード18）が実線で示す所期位置から想像線で示すように位置ずれを起こしてしまうことがあった。

【0010】この位置ずれを解決するために、例えば特開昭64-32697号公報に開示されるように、半田付け確認用電極を部品端面の対向する位置に形成し、半田付けの良否を判定する技術が提案されている。

【0011】

【発明が解決しようとする課題】しかしながら、上記の特開昭64-32697号公報に示す従来技術の場合、半田付け確認用の電極が部品端面の対向する位置に形成されるため、部品が半田付け確認用の電極同士を結ぶ線と直交する方向にずれる可能性がある。

【0012】従って、この発明は上記の課題を解決することを目的とし、実装部品の位置ずれを生じることなく、プリント基板の上方から半田付けの良否を容易かつ精度良く判定することを可能とし、よって検査工程の作業能率を向上させるようにしたプリント基板の実装部品用パッドを提供することを目的とする。

【0013】

【課題を解決するための手段】上記課題を解決するため、請求項1項に記載の発明においては、プリント基板上に設けられ、塗布されたクリーム半田によって表面実装部品が溶融接続されるプリント基板の実装部品用パッドにおいて、前記表面実装部品の底部に円形状の電極を設け、前記プリント基板上に引出し部を有するパッドを設けると共に、前記引出し部を前記表面実装部品の外周より突出させ、さらに前記パッドの引出し部を除く直径を前記表面実装部品の直径よりも小さく、かつ前記表面実装部品底部の円形状の電極と略同大に形成するように構成した。

【0014】これにより、実装部品の位置ずれを生じることなく、プリント基板の上方から半田付けの良否を容易かつ精度良く判定することを可能とし、よって検査工程の作業能率を向上させることができる。

【0015】また請求項2項においては、前記引出し部を少なくとも2個設けると共に、前記パッドから離間した位置に第2のパッドを設け、前記2個の引出し部を、前記パッドと前記第2のパッドの中心位置を結ぶ線に対して対称となる位置に設けるように構成した。

【0016】これにより、前記した効果に加え、より一層位置ずれを効果的に防止することができる。

【0017】また請求項3項においては、前記引出し部を、前記プリント基板上の前記表面実装部品、例えば抵抗やFETなどのプリント基板上に配置される素子を除く部品に干渉しない位置に設けるように構成した。

【0018】これにより、前記した効果に加え、基板の実装面積を不必要に減少させることがない。

【0019】

【発明の実施の形態】以下、添付図面を参照して、本発明の一つの実施の形態に係るプリント基板の実装部品用パッドを説明する。

【0020】図1は、本実施形態に係るプリント基板の実装部品用パッド30の全体構成を示す上面図である。尚、以降の図において従来技術に係るものと特に相違のないものについては、従来技術の説明の際に用いた符号と同じ符号を使用する。

【0021】本実施形態に係るプリント基板の実装部品用パッド30は、第1のパッド32および第2のパッド34から構成される。ここで、第2のパッド34は従来のもと同様の形状であると共に、第1のパッド32の円形状の中心に対して対向する位置である。また、第2のパッドからの距離が等しくなる位置には、引出し部36、36が設けられる。

【0022】図2は本実施形態に係るプリント基板の実装部品用パッド30の正面図である。この位置から見た場合、プリント基板100上の実装部品用パッド30は引出し部36を除くと従来技術に係るパッド10と大きな相違はない。また、図3は図2のIII-III線断面図であるが、第1のパッド32の断面の横方向の長さは、 $(\text{第1のパッド32の円形状部分の直径}) + (\text{引出し部36の延長部分長}) \times 2$ となる。

【0023】尚、引出し部36の延長部分長は、プリント基板100の実装面積、すなわち他の実装部品との干渉および部品の位置ずれを考慮して前記第1のパッド32の円形状部分の直径の $1/3$ 程度またはそれ以下とする。また、第1のパッド32および第2のパッド34は、プリント基板100側において適宜な回路(図示せず)に接続される。

【0024】次いで、本実施形態に係るプリント基板の実装部品用パッド30へのダイオード18の実装につい

て説明する。

【0025】図4は、本実施形態に係るプリント基板の実装部品用パッド30に、ダイオード18を実装した状態の上面図である。図5は、上述のようにダイオード18が実装された状態の説明側面図、図6は図5のVI-VI線断面図である。図示の如く、ダイオード18の実装は、パッドに塗布されたクリーム半田の上にダイオード18を配置し、次いで加熱してクリーム半田を溶融(リフロー)させ、ダイオード18の円形状の端子18aを第1のパッド32に接続固着させると共に、他の端子18bを第2のパッド34へ接続固着させることによって行う。

【0026】図5などから明らかなように、引出し部36に塗布されたクリーム半田は、リフロー後に半田フィレット40aとして凝固して引出し部36上に残留する。尚、図9の説明と同様にダイオード18の内部構造についての図示は、本発明の要旨と関連しないために省略した。

【0027】次いで、良否判定について説明する。本実施形態に係るプリント基板の実装部品用パッド30に前記ダイオード18などの部品を実装した際の半田付けの良否の判定は、図5に良く示すように、従来技術の説明にて前述したような、プリント基板38の上方からCCDカメラなどにより撮像して得た二値画像に基づいて、あるいは目視などの検査手段20を用いて行う。

【0028】本実施の形態にあつては上述のように構成したため、ダイオード18の実装状態を従来技術で用いたようにプリント基板上方から検査した場合でも、引出し部36上に残留した半田フィレット40aに基づいて半田付けの良否を容易かつ精度良く判定することができる。よって検査工程の作業能率を向上させることができる。

【0029】また、引出し部36の延長部分長を、前記第1のパッド32の円形状部分の直径の $1/3$ 程度またはそれ以下であるように構成したので、プリント基板の有効実装面積を不必要に減少させることがないと共に、位置ずれを起こすことがない。

【0030】この実施の形態は上記したように、プリント基板100上に設けられ、塗布されたクリーム半田によって表面実装部品(ダイオード18)が溶融(リフロー)接続されるプリント基板の実装部品用パッド30において、前記表面実装部品の底部に円形状の電極18aを設け、前記プリント基板上に引出し部36、36を有するパッド(第1のパッド32)を設けると共に、前記引出し部を前記表面実装部品の外周より突出させ、さらに前記パッドの引出し部を除く直径を前記表面実装部品の直径よりも小さく、かつ前記表面実装部品底部の円形状の電極と略同大に形成するように構成した。

【0031】また、前記引出し部を少なくとも2個設けると共に、前記パッドから離間した位置に第2のパッド

を設け、前記2個の引出し部を、前記パッドと前記第2のパッドの中心位置を結ぶ線に対して対称となる位置に設けるように構成した。

【0032】また、前記引出し部を、前記プリント基板上の前記表面実装部品、例えば抵抗やFETなどのプリント基板上に配置される素子を除く部品に干渉しない位置に設けるように構成した。

【0033】本発明の実施の形態にあって、引出し部36、36を除いたパッド32の形状を円形としたが、それに限られるものではなく、位置ずれを生じない形状であればどのような形状でも良い。

【0034】また、上述の実施形態において第2のパッド34の形状は従来技術における第2のパッド14の形状と同形としたが、この形状に限られるものではない。

【0035】

【発明の効果】請求項1項に記載の発明においては、実装部品の位置ずれを生じることなく、プリント基板の上方から半田付けの良否を容易かつ精度良く判定することを可能とし、よって検査工程の作業能率を向上させることができる。

【0036】また、請求項2項に記載の発明においては、前記した効果に加え、より一層位置ずれを効果的に防止することができる。

【0037】また、請求項3項に記載の発明においては、前記した効果に加え、基板の実装面積を不必要に減少させることがない。

【図面の簡単な説明】

【図1】本発明の一つの実施形態に係るプリント基板の実装部品用パッドの全体構成を示す上面図である。

【図2】図1に示すプリント基板の実装部品用パッドを

下方から見た側面図である。

【図3】図2に示すプリント基板の実装部品用パッドのIII-III線断面図である。

【図4】図1に示すプリント基板の実装部品用パッドにダイオードを実装した状態を示す上面図である。

【図5】図4に示す実装状態を下方から見た説明側面図である。

【図6】図5に示す実装状態のVI-VI線断面図である。

【図7】従来技術に係るプリント基板の実装部品用パッドの上面図である。

【図8】従来技術に係るプリント基板の実装部品用パッドにダイオードを実装した状態の左側面図である。

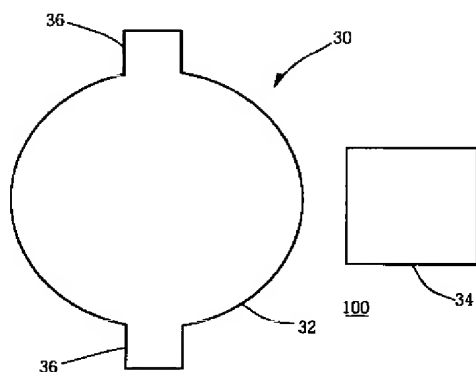
【図9】図8を別な方向から見た説明側面図である。

【図10】従来技術に係るプリント基板の実装部品用パッドにあって、実装されたダイオードが位置ずれを生じた状態を示す説明図である。

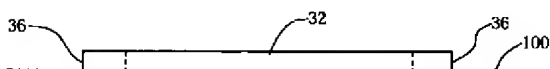
【符号の説明】

- 10 プリント基板の実装部品用パッド（従来技術）
- 12 第1のパッド（従来技術）
- 14 第2のパッド（従来技術）
- 16 半田フィレット
- 18 実装部品（パワーツェナダイオード）
- 20 検査手段（二値化カメラ、目視など）
- 30 プリント基板の実装部品用パッド
- 32 第1のパッド
- 34 第2のパッド
- 36 引出し部
- 40, 40a 半田フィレット
- 100 プリント基板

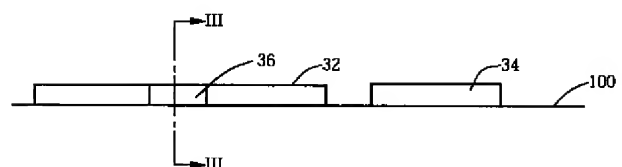
【図1】



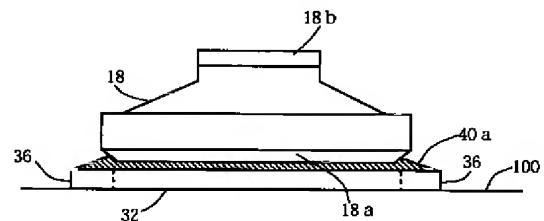
【図3】



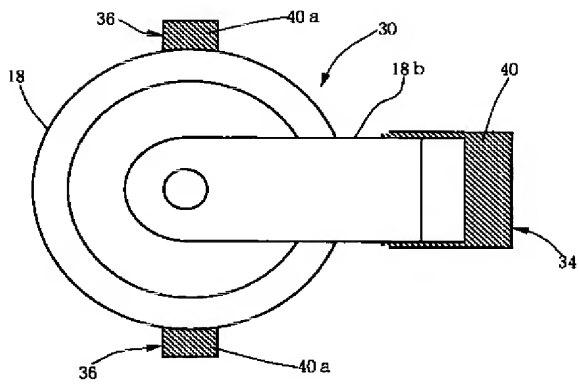
【図2】



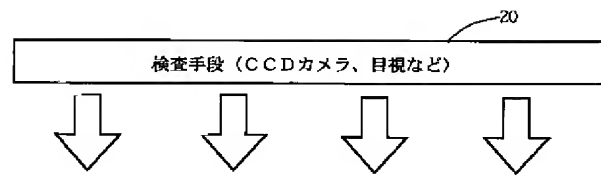
【図6】



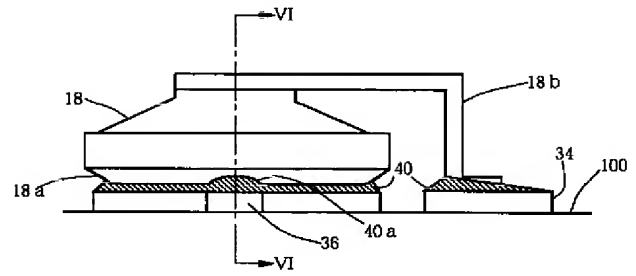
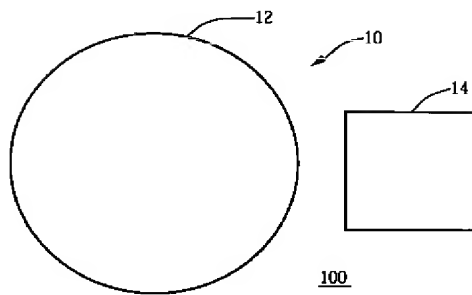
【図4】



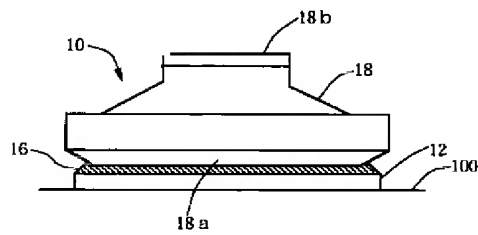
【図5】



【図7】

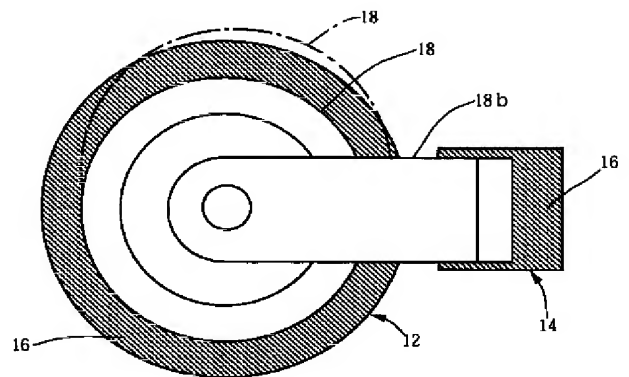
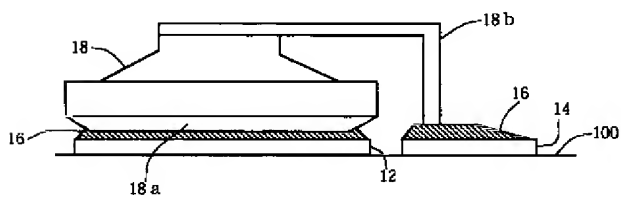
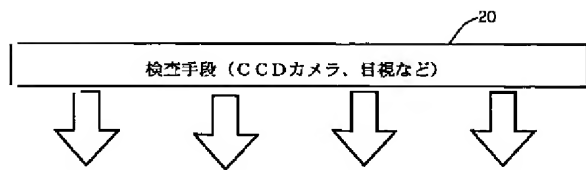


【図8】



【図9】

【図10】



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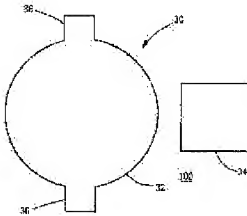
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(22)Date of filing : 13.09.1999 (72)Inventor : SHOJI MASAHIKO

(54) PAD FOR MOUNTING COMPONENT OF PRINTED BOARD



(57)Abstract:

PROBLEM TO BE SOLVED: To provide a pad for mounting the components of printed board, which can improve the efficiency in work of inspection processes by making the quality of soldering easily distinguishable with accuracy, without causing positional deviation of surface-mounting components at fixing of the components on the pad through soldering by using cream solder applied to the pad.

SOLUTION: A pad 30 for mounting components is constituted of a circular first pad 32, which has nearly the same size as the bottom electrode of a surface-mounting components has and two lead-out sections 36 and 36 and a second pad 34, which is arranged separately from the pad 32 and the lead-out sections 36 are formed, so that the sections 36 protrude outward from the outer periphery of the parts. The quality of soldering is discriminated, based on the solder filters which are left on the lead-out sections 36 after reflow.

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CLAIMS

[Claim(s)]

[Claim 1]In a pad for mounting components of a printed circuit board by which it is provided on a printed circuit board and melting connection of the surface mounted device is made with applied cream solder, Provide an electrode of a circle configuration in a pars basilaris ossis occipitalis of said surface mounted device, and provide a pad which has a drawer part on said printed circuit board, and. A pad for mounting components of a printed circuit board having made said drawer part project from a periphery of said surface mounted device, are smaller than a diameter of said surface mounted device, and forming a diameter except a drawer part of said pad in an electrode and the approximately said size of a circle configuration of said surface mounted device pars basilaris ossis occipitalis further.

[Claim 2]Provide said at least two drawer parts, and the 2nd pad is provided in a position estranged from said pad, A pad for mounting components of a printed circuit board given in claim 1 paragraph providing said two drawer parts in a position which becomes symmetrical to a line which connects a center position of said pad and said 2nd pad.

[Claim 3]Claim 1 paragraph or a pad for mounting components of a printed circuit board given in dyadic providing said drawer part in a position which does not interfere in parts except said surface mounted device on said printed circuit board.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention]About the pad for mounting components of a printed circuit board, in more detail, this invention is a printed board surface and relates to the shape of the pad for mounting components of a printed circuit board where soldering fixation of the surface mounted device in which it comes to form the terminal electrode is carried out to the bottom.

[0002]

[Description of the Prior Art]When parts, such as power zener diode with which it comes to form a terminal electrode in the bottom of parts, are mounted on a printed circuit board in conventional technology, Cream solder is first applied to the pad of a printed circuit board, subsequently to the cream solder top of a pad the above-mentioned parts are arranged and heated, and it is mounting by making melting connection (reflow) of the cream solder.

[0003]The mounted state, especially the quality of soldering are generally judged by viewing etc. based on the binary picture obtained from the upper part of the substrate by picturizing with the CCD camera etc.

[0004]The pad for mounting components and inspection method of a printed circuit board which start conventional technology based on drawing 7 thru/or drawing 9 are explained.

[0005]The plan of the pad for mounting components of the printed circuit board which requires drawing 7 for conventional technology, the left side view in the state where drawing 8 mounted power zener diode (henceforth a "diode") in it, and drawing 9 are the explanation side view.

[0006]The pad 10 for mounting components of the conventional printed circuit board comprises the 1st pad 12 and 2nd pad 14. Shape of the 1st pad 12 is made circular according to the shape of the terminal electrode of the parts mounted, and also let the diameter be the bottom of said circular terminal electrode with the size mostly here. The numerals 100 show a printed circuit board.

[0007]As shown in drawing 8, the diode 18 is connected to the pad 10 after component mounting via the solder fillet 16. Said diode 18 has the terminal 18a of the circle configuration connected to the 1st pad 12, and the terminal 18b which should be connected to the 2nd pad 14.

[0008]When adherence connection is made and the diode 18 is mounted on the pad 12 which set the terminal 18a of the circle configuration of said diode 18 by the shape, the solder fillet 16 will be hidden by a mounting component. Therefore, as shown in drawing 9, when it was going to judge the quality of soldering from the upper part of a substrate by the inspection means 20, such as a CCD camera and viewing, the quality

of the solder fillet 16 was not able to be judged with sufficient accuracy.

[0009]In order to solve it, expanding the diameter of the 1st pad 12 is also considered, but. The solder near a pad center might become high with surface tension at the time of a reflow, and the position gap might be caused as were shown in drawing 10, and a fictitious outline showed from the expected position which a mounting component (diode 18) shows as a solid line.

[0010]In order to solve this position gap, the electrode for a soldering check is formed in the position which the part end face counters, and the art of judging the quality of soldering is proposed so that it may be indicated by JP,64-32697,A, for example.

[0011]

[Problem(s) to be Solved by the Invention]However, since the electrode for a soldering check is formed in the position which the part end face counters in the case of the conventional technology shown in above-mentioned JP,64-32697,A, parts may shift in the direction which intersects perpendicularly with the line which connects the electrodes for a soldering check.

[0012]Therefore, this invention, without producing a position gap of a mounting component for the purpose of solving the above-mentioned technical problem, It makes it possible to judge the quality of soldering with easily and sufficient accuracy from the upper part of a printed circuit board, and aims at providing the pad for mounting components of the printed circuit board it was made to raise the working capacity of an inspection process therefore.

[0013]

[Means for Solving the Problem]In [in order to solve an aforementioned problem] an invention given in claim 1 paragraph, In a pad for mounting components of a printed circuit board by which it is provided on a printed circuit board and melting connection of the surface mounted device is made with applied cream solder, Provide an electrode of a circle configuration in a pars basilaris ossis occipitalis of said surface mounted device, and provide a pad which has a drawer part on said printed circuit board, and. Said drawer part was made to project from a periphery of said surface mounted device, and it constituted so that it might be smaller than a diameter of said surface mounted device and a diameter except a drawer part of said pad might be further formed in an electrode and the approximately said size of a circle configuration of said surface mounted device pars basilaris ossis occipitalis.

[0014]Thereby, without producing a position gap of a mounting component, it can make it possible to judge a quality of soldering with easily and sufficient accuracy from the upper part of a printed circuit board, and, therefore, working capacity of an inspection process can be raised.

[0015]In claim 2 paragraph, said at least two drawer parts were provided, and it constituted so that the 2nd pad might be provided in a position estranged from said pad and said two drawer parts might be provided in a position which becomes symmetrical to a line which connects a center position of said pad and said 2nd pad.

[0016]Thereby, in addition to the effect, a position gap can be prevented further effectively.

[0017]In claim 3 paragraph, it constituted so that said drawer part might be provided in a position which does not interfere in parts except an element arranged on printed circuit boards, such as said surface mounted device on said printed circuit board, for example, resistance, and FET.

[0018]Thereby, in addition to the effect, a packaging area of a substrate is not decreased superfluously.

[0019]

[Embodiment of the Invention]Hereafter, with reference to an accompanying drawing, the pad for mounting components of the printed circuit board concerning one embodiment of this invention is explained.

[0020]Drawing 1 is a plan showing the entire configuration of the pad 30 for mounting components of the printed circuit board concerning this embodiment. About what starts conventional technology in subsequent figures, and especially a thing without a difference, the same numerals as the numerals used on the occasion of explanation of conventional technology are used.

[0021]The pad 30 for mounting components of the printed circuit board concerning this embodiment comprises the 1st pad 32 and 2nd pad 34. Here, the 2nd pad 34 is the same shape as the conventional thing, and it is a position which counters to the center of the circle configuration of the 1st pad 32. The drawer parts 36 and 36 are formed in the position in which the distance from the 2nd pad becomes equal.

[0022]Drawing 2 is a front view of the pad 30 for mounting components of the printed circuit board concerning this embodiment. When it sees from this position, the pad 30 for mounting components on the printed circuit board 100 does not have the pad 10 concerning conventional technology, and a big difference, when the drawer part 36 is removed. Although drawing 3 is an III-III line sectional view of drawing 2, the length of the transverse direction of the section of the 1st pad 32 is set to ((diameter for circular shaped part of 1st pad 32) +(extension length of drawer part 36) x2).

[0023]The extension length of the drawer part 36 uses less than about 1/3 and it of the diameter for the circular shaped part of said 1st pad 32 in consideration of interference with the packaging area of the printed circuit board 100, i.e., other mounting components, and a position gap of parts. The 1st pad 32 and 2nd pad 34 are connected to the printed circuit board 100 side in a proper circuit (not shown).

[0024]Subsequently, mounting of the diode 18 to the pad 30 for mounting components of the printed circuit board concerning this embodiment is explained.

[0025]Drawing 4 is a plan in the state where the diode 18 was mounted in the pad 30 for mounting components of the printed circuit board concerning this embodiment. The explanation side view in the state where the diode 18 was mounted as mentioned above as for drawing 5, and drawing 6 are the VI-VI line sectional views of drawing 5. Like a graphic display, mounting of the diode 18 arranges the diode 18 on the cream

solder applied to the pad, Subsequently, heat, carry out melting (reflow) of the cream solder, and the 1st pad 32 is made to carry out connection adherence of the terminal 18a of the circle configuration of the diode 18, and it carries out by carrying out connection adherence of other terminals 18b to the 2nd pad 34.

[0026]The cream solder applied to the drawer part 36 is solidified as the solder fillet 40a after a reflow, and remains on the drawer part 36 so that clearly from drawing 5 etc. Like explanation of drawing 9, since it was not connected with the gist of this invention, the graphic display about the internal structure of the diode 18 was omitted.

[0027]Subsequently, a quality decision is explained. The judgment of the quality of soldering at the time of mounting parts, such as said diode 18, in the pad 30 for mounting components of the printed circuit board concerning this embodiment, Based on the binary picture obtained from the upper part of the printed circuit board 38 which was mentioned above in explanation of conventional technology by picturizing with a CCD camera etc., it carries out using the inspection means 20, such as viewing, so that it may be well shown in drawing 5.

[0028]Even when it inspects from the printed circuit board upper part as the mounted state of the diode 18 was used by conventional technology since it constituted as mentioned above if it was in this embodiment, Based on the solder fillet 40a which remained on the drawer part 36, the quality of soldering can be judged with easily and sufficient accuracy, and, therefore, the working capacity of an inspection process can be raised.

[0029]Since the extension length of the drawer part 36 was constituted that it is less than about $1/3$ and it of the diameter for the circular shaped part of said 1st pad 32, the effective packaging area of a printed circuit board is not decreased superfluously, and a position gap is not caused.

[0030]In the pad 30 for mounting components of the printed circuit board by which it is provided on the printed circuit board 100, and melting (reflow) connection of the surface mounted device (diode 18) is made with the applied cream solder as this embodiment was described above, Form the electrode 18a of a circle configuration in the pars basilaris ossis occipitalis of said surface mounted device, and provide the pad (the 1st pad 32) which has the drawer parts 36 and 36 on said printed circuit board, and. Said drawer part was made to project from the periphery of said surface mounted device, and it constituted so that it might be smaller than the diameter of said surface mounted device and the diameter except the drawer part of said pad might be further formed in the electrode and the approximately said size of a circle configuration of said surface mounted device pars basilaris ossis occipitalis.

[0031]Said at least two drawer parts were provided, and it constituted so that the 2nd pad might be provided in the position estranged from said pad and said two drawer parts might be provided in the position which becomes symmetrical to the line which connects the center position of said pad and said 2nd pad.

[0032]It constituted so that said drawer part might be provided in the position which

does not interfere in the parts except the element arranged on printed circuit boards, such as said surface mounted device on said printed circuit board, for example, resistance, and FET.

[0033]Although it is in an embodiment of the invention and shape of the pad 32 except the drawer parts 36 and 36 was made circular, as long as it is the shape which is not restricted to it and does not produce a position gap, what kind of shape may be sufficient.

[0034]In an above-mentioned embodiment although the shape of the 2nd pad 34 is of the same shape as the shape of the 2nd pad 14 in conventional technology, it is not restricted to this shape.

[0035]

[Effect of the Invention]In an invention given in claim 1 paragraph, without producing a position gap of a mounting component, it can make it possible to judge the quality of soldering with easily and sufficient accuracy from the upper part of a printed circuit board, and, therefore, the working capacity of an inspection process can be raised.

[0036]In addition to said effect, in the invention of a statement, a position gap can be further prevented effectively in claim 2 paragraph.

[0037]In addition to said effect, in the invention of a statement, the packaging area of a substrate is not superfluously decreased in claim 3 paragraph.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1]It is a plan showing the entire configuration of the pad for mounting components of the printed circuit board concerning one embodiment of this invention.

[Drawing 2]It is the side view which looked at the pad for mounting components of the printed circuit board shown in drawing 1 from the lower part.

[Drawing 3]It is an III-III line sectional view of the pad for mounting components of the printed circuit board shown in drawing 2.

[Drawing 4]It is a plan showing the state where the diode was mounted in the pad for mounting components of the printed circuit board shown in drawing 1.

[Drawing 5]It is the explanation side view which looked at the mounted state shown in drawing 4 from the lower part.

[Drawing 6]It is a VI-VI line sectional view of the mounted state shown in drawing 5.

[Drawing 7]It is a plan of the pad for mounting components of the printed circuit board concerning conventional technology.

[Drawing 8]It is a left side view in the state where the diode was mounted in the pad for mounting components of the printed circuit board concerning conventional technology.

[Drawing 9]It is the explanation side view which looked at drawing 8 from another direction.

[Drawing 10]It is in the pad for mounting components of the printed circuit board concerning conventional technology, and the mounted diode is an explanatory view showing the state where the position gap was produced.

[Description of Notations]

10 The pad for mounting components of a printed circuit board (conventional technology)

12 The 1st pad (conventional technology)

14 The 2nd pad (conventional technology)

16 Solder fillet

18 Mounting component (power zener diode)

20 Inspection means (a binarization camera, viewing, etc.)

30 The pad for mounting components of a printed circuit board

32 The 1st pad

34 The 2nd pad

36 Drawer part

40 and 40a solder fillet

100 Printed circuit board

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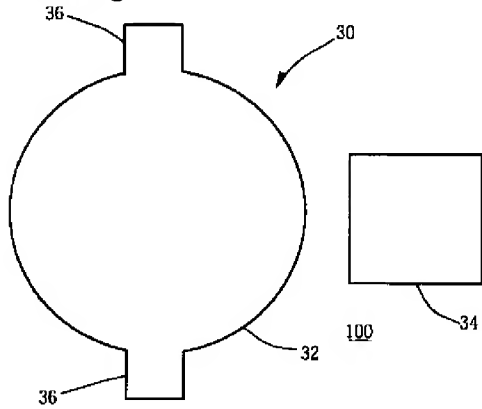
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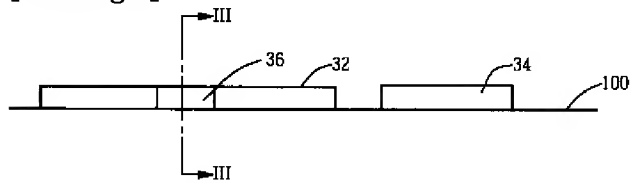
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DRAWINGS

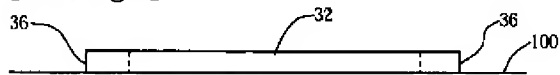
[Drawing 1]



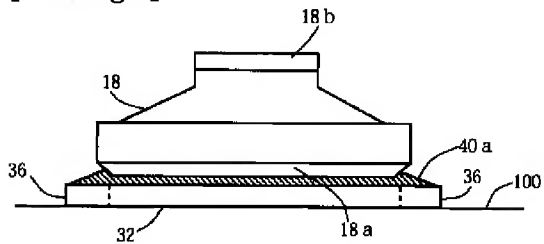
[Drawing 2]



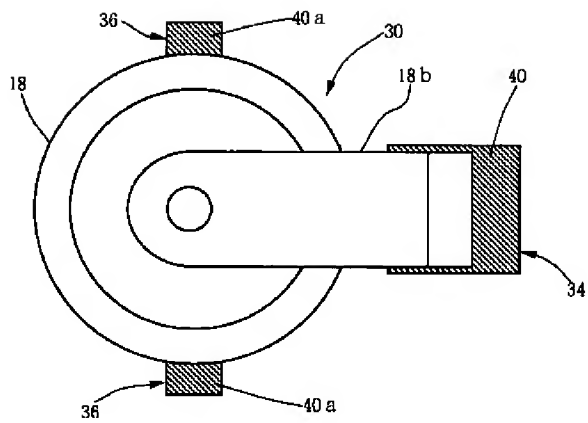
[Drawing 3]



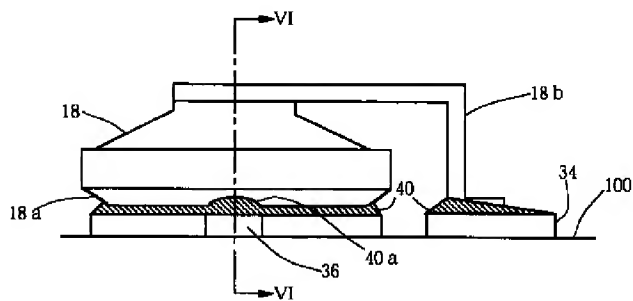
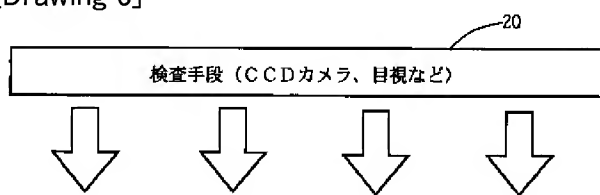
[Drawing 6]



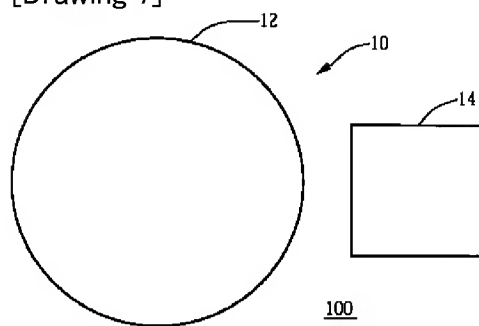
[Drawing 4]



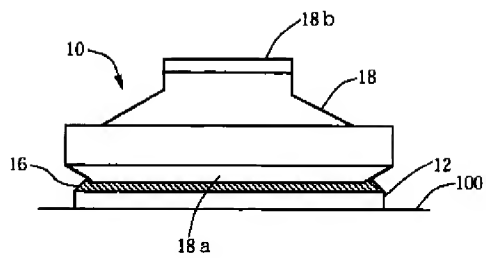
[Drawing 5]



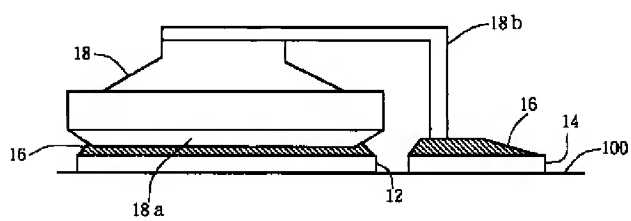
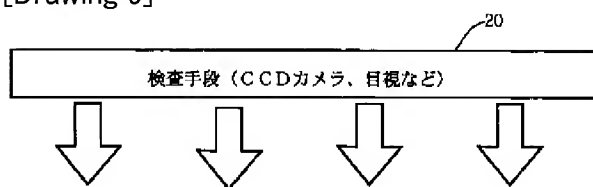
[Drawing 7]



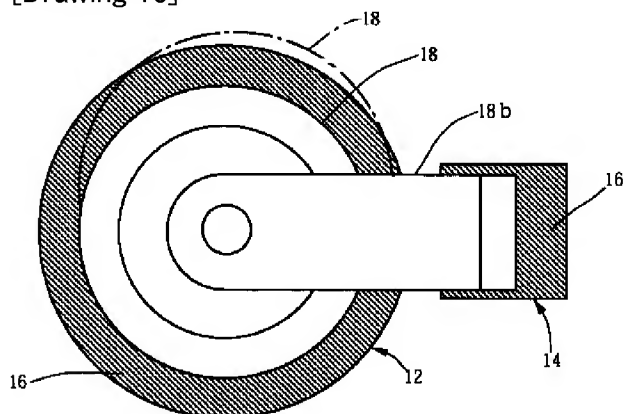
[Drawing 8]



[Drawing 9]



[Drawing 10]



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